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(where we miss the results of Standfuss and Fischer), and finally discusses adaptive variation. The author admits the importance of self-adaptations, which are, however, in his opinion, of little effect without natural selection. 'Degeneration' is a difficulty that the author does not attempt to compass, while admitting the unsatisfactory nature of Weismann's explanation. He should remember that the theory that phylogenetic 'degeneration' is due to disuse has inadequate support, and that animals with 'degenerate' organs, however produced, can still be adapted if they get into situations where such organs are of no use.

The book will be a welcome one to those who desire quickly to get at the recent literature on variation. The data are given in an impartial, sometimes even colorless way. The book lacks the vigor of the special plea and the enthusiasm of the book of one idea. It will be found very useful; but it will not found a school. C. B. DAVENPORT.

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES.

SECTION OF GEOLOGY AND MINERALOGY.

A REGULAR meeting of the Section of Geology and Mineralogy was held at the rooms of the American Museum of Natural History on the evening of April 20, with Professor Kemp in the chair. Dr. A. A. Julien presented the results of his work on the hornblende schist which occurs at the extreme northern end of Manhattan Island near Spuyten Duyvil Creek. He was able, in the first place, to prove the undoubted igneous origin of this rock by the unaltered crystals pointing to an original gabbro which it still preserves. The speaker then presented his views in favor of the igneous origin of all the hornblende schists of Manhattan Island.

The second paper was by Mr. D. W. Johnson, on 'The Geology of the Cerrillos Hills, New Mexico.' The Cerrillos Hills form the most northerly group of a series of four laccolithic mountain masses in north-central New Mexico. The relation of these hills to the associated Cretaceous beds and the age of the intrusion

were discussed. A brief petrographical description of the several igneous rocks was given and the subdivision and correlation of the sedimentaries on paleontological grounds considered. The origin of the anthracite coal of the Madrid area and the origin of the famous turquoise deposits of the hills were then treated. The speaker closed with a résumé of the geologic history of the region. Professor Kemp led in the discussion which followed. Dr. H. S. Washington was asked by the chairman to calculate an analysis of the type of andesite which is found in the Cerrillos Hills.

GEORGE I. FINLAY,

Secretary pro tem.

ON May 18 the first paper was by Dr. George I. Finlay, of Columbia University, and was upon 'The Geology of the Nephelite Syenite Area at San José, Tamaulipas, Mexico.'

In this paper Dr. Finlay said in part: The town of San José in the state of Tamaulipas, Mexico, lies in a hollow surrounded on all sides by mountains, and is about seventy miles from the coast of the Gulf of Mexico. The range of peaks immediately to the south of it, and extending for fifteen miles in that direction, is of nephelite syenite. The range is known as the San Carlos Mountains. San José itself is on the site of an eroded laccolith of andesite (locally known as 'porphyry'), intruded into limestone. Some limestone masses stand on end within the areas of the laccolith, and are thought to have floated or worked their way down to their present position during the intrusion of the igneous rock. There are two or three hundred of these isolated limestone masses, and it is in connection with these that the copper ores are found. Contact metamorphism has not been developed to any great extent in the limestone surrounding the laccolith, but has been greatly induced in the included masses, marble, grossularite, vesuvianite and several other minerals being the products. Aside from the occurrence of the nephelite-syenite in the area south of the laccolith, the region is interesting on account of the dyke rocks which are found cutting the andesite of the laccolith. Among these are analcite-

tinguaites and camptonites, as well as vogesite and diabase. Two main streams now drain the hollow formed by the down-cutting of the dome where the weaker andesite has been laid bare as far as the limestone cover has been cut back.

Dr. Finlay's paper was discussed by Professor Kemp, who called attention to the fact that the character of the intruded limestone was not yet entirely clear; and by Dr. H. S. Washington, who dwelt on the interest attaching to the additional localities here and elsewhere recently reported for the peculiar dyke rocks mentioned.

The second paper of the evening was by Fred H. Moffet, Columbia University, and was entitled 'The Copper Mines of Cobre, Santiago de Cuba.'

In this paper Mr. Moffet said in abstract: The copper mines of El Cobre are located about nine miles west of the Bay of Santiago, where a series of eruptive flows, andesites and rhyolites, are interbedded with fragmental rocks, agglomerates, breccias and tuffs. The strike of the beds is east and west, and they dip at a low angle to the north. The series is cut by trap dykes and by two major systems of faults, the older of which runs east and west and carries with it the large ore bodies. The second major system has direction nearly north and south. Cross faults cut and displace the ore bodies of the older system, and carry copper, though in less amount. The copper workings of the old English mining companies produced enormous quantities of very rich oxidized ore which gave place in the lower levels to sulphides. Much difficulty is encountered in handling the mine water on account of the porous nature of the country rock. At the present time the iron ore of the region is of much greater commercial importance than the copper.

In the discussion which followed, Professor Kemp spoke of the great importance to the United States steel furnaces which these deposits possessed on account of their great extent and convenient location. The ore is extremely low in phosphorus but contains some sulphur. The copper may again be of great

importance, though but little is being done at present toward its exploitation.

E. O. HOVEY,
Secretary.

ANTHROPOLOGICAL SOCIETY OF WASHINGTON.

THE 347th meeting was held May 12. Dr. J. Walter Fewkes, who recently returned from the West Indies, gave a brief account of his work in Porto Rico and Santo Domingo, reserving a fuller presentation till next meeting. The paper of the evening was by Dr. E. A. Spitzka, entitled 'Cerebral Characteristics of Distinguished Men, with special reference to the late Major J. W. Powell.' Following is an abstract:

Dr. Spitzka reviewed previous records of brains of distinguished men and proceeded to a consideration of their chief characteristics, particularly the brain-weight and the surface morphology—both generally and with special reference to certain cortical areas. Dr. Spitzka had tabulated the brain-weights of ninety-seven men eminent in the professions, arts and sciences; compared with the series of 'ordinary' brain-weights collected by Bischoff and Marchand, there was a relatively and decidedly greater number of heavier brains in the former series. In a further analysis it was shown that the brains of men devoted to the higher intellectual occupations, such as the mathematical sciences, involving the most complex mechanisms of the mind, those of men who devised original lines of research (Cuvier, Cope, Agassiz) and those of forceful characters like Ben Butler or Daniel Webster possess the heaviest brains. The increase in brain-weight during evolutionary progress is directly related to the increase of cranial capacity along with the development of brachycephaly. As for the cerebral surface appearances, the highly intellectual man is likely to exhibit not only a superior degree of fissural and gyral complexity in general, but of certain cortical fields in particular. These differences in the extent of certain cortical (especially the associative) areas are palpable and measurable. Particularly important in this relation is the insula (Island of Reil), probably the purest

association center in the brain, and usually showing a superior degree of development in men whose powers of speech were of a high order.

The brain of Major J. W. Powell (to be described in the *American Anthropologist*) exhibited a decidedly superior degree of development. Its weight, 1,488 grams, was above the average of the 97 brains of eminent men, and for a man below medium stature and of rather small frame and whose age was 68, it was notably above the average. The most notable feature is a redundancy in the subparietal association area (especially the angular gyre) on the right side, a feature which may not be unrelated to an important characteristic of Major Powell's mental make-up: that of keen observation and superior powers of generalizing these. A large number of charts and figures of brains of notable persons illustrated the paper.

In discussing the paper Dr. Frank Baker held that the convolutionary pattern of the brain is due to the needs of motor activity, and any conclusions from it as to brain power should be carefully weighed.

Professor W J McGee stated that Major Powell's strength lay in generalizing on observations in nature and that the address of Dr. Spitzka shows that it is now possible to trace a definite relation between cerebral structure and the psychical character of an individual. Dr. Ales Hrdlicka said that it is a well-known fact that every organ in the body, if more than ordinarily exercised, receives an augmented blood-supply and in consequence tends in time to increase in size and weight. It would be very strange if the brain formed an exception to this law. It is true that the efficiency of a brain may increase by the advance of the differentiation of its minute elements, but in all probability this and actual growth go hand in hand, and the size and weight of the brain must be of considerable importance in the study of the organ. That no very definite results in this respect have as yet been generally arrived at is due to the fact that we are practically only in the beginnings of brain study and need

many additional accurate data on normal material, and that not only in white but also in various more primitive peoples. We need many further data on the significance in brain study of race, sex, stature, muscularity, age as well as other factors. The significance of the convolutionary pattern is particularly in need of further investigation, yet it is a general opinion that a marked complexity of the convolutions goes with the superior brain and *vice versa*. Dr. Hrdlicka expressed a hope of establishing in the course of time a valuable brain collection in his division in the U. S. National Museum.

Further remarks germane to the topic were made by Dr. D. S. Lamb, Dr. J. Walter Fewkes, Mr. G. K. Gilbert and Mrs. Miranda B. Tulloch. Dr. Spitzka made some closing remarks. At the conclusion of the meeting a vote of thanks was tendered Dr. Spitzka. It is expected that the paper will be published in a forthcoming number of the *American Anthropologist*.

WALTER HOUGH,
General Secretary.

THE BOTANICAL SOCIETY OF WASHINGTON.

THE fifteenth regular meeting of the society was held at the Portner Hotel, May 23, 1903, with President A. F. Woods in the chair and twenty-four persons present. At the close of the business meeting, Dr. W. H. Evans, chairman of the scientific program for the evening, was called to the chair.

Dr. R. E. B. McKenney communicated 'Notes on *Saccharomyces niger*.' This rather uncommon fungus, which has been considered to be a true yeast, can by certain methods of culture be made to produce a well-developed, branched mycelium. Under such conditions the mycelium is septate, while under others it is unseptate. True ascospores were not observed; and it was considered probable that Marpmann, who claims to have found them, mistook certain refractive metabolic bodies for such spores. The formation of false zygospore structures was also noted. The fungus is capable of continued growth for a couple of months in nutrient media, which is apparently free from nitrogen. It would

seem, therefore, that *Saccharomyces niger* is to be added to the small list of fungi which are thus capable of assimilating free nitrogen from the air. Mention was also made of certain other of the nutrition phenomena of this fungus.

Dr. George T. Moore gave a very interesting address on a new method of artificially inoculating soils for legumes with the nitrogen-assimilating, tubercle-forming bacteria. The practical application of the method is very simple and was fully described. The paper will be published in full as a bulletin of the Bureau of Plant Industry, U. S. Department of Agriculture. H. J. WEBBER.

DISCUSSION AND CORRESPONDENCE.

THE GRAND GULF FORMATION.

IN SCIENCE of December 12, 1902, Professor Dall, in commenting on our note on the Grand Gulf Formation, published in the number for November 21, 1902, calls our attention to two errors, which we now acknowledge and are very glad to correct. We made the statement that Dr. Hilgard had considered the Grand Gulf as of Eocene age. This is a mistake which escaped us both in the manuscript and in the proof-reading. Since Dr. Hilgard's work forms the basis of all our knowledge of the Gulf Coastal Plain, we knew from long-continued study thereof that there was not a line in all his writings which could be interpreted as even suggesting this age for the Grand Gulf. So also we were mistaken in saying that Professor Dall had regarded it as of Eocene age.

It is, furthermore, evident from Professor Dall's criticisms that we have not stated our case with sufficient clearness to prevent misunderstanding of our position. Inasmuch as to us the facts in our possession seem to afford absolute proof of the correctness of our conclusions, we beg to submit the evidence somewhat more fully to the consideration of the geologists interested.

At the outset it seems necessary to define clearly what we mean by Grand Gulf, and we can do no better than to follow Hilgard, who has so well described these beds, and who

has correctly mapped them as covering the lower part of the state of Mississippi from the southern limit of the Vicksburg down to within a few miles of the Gulf of Mexico.

The materials of the formation are sandstones, sands and clays, with silicified trunks of trees and beds of lignite, and lignitic clays containing leaf impressions, badly preserved and incapable of determination. Concerning these Grand Gulf beds Dr. Hilgard remarks: "Two points confront us in the discussion of the relations of the formation to the sea; the great rarity of the calcareous feature in the main body of the formation, and the utterly 'unmarine' character of the materials generally, in the constant recurrence of the lignito-gypseous facies." And again, "Of the sweep of 900 miles thus outlined as the known extent of this formation, 400 may be considered as having been examined sufficiently in detail to prove the absence of marine fossils from the formation; the portion so examined embracing, moreover, its widest part and fully two thirds of the area of the outcrop."*

By the characters thus outlined, this great fresh-water formation has been recognized and described by the geologists in Georgia, Florida, Alabama, Mississippi, Louisiana and Texas. No one has had any serious difficulty in distinguishing it in the field; but every one has had difficulty in reconciling the known facts of its surface distribution with any satisfactory assignment of it to a definite place in the stratigraphic column. The only formation with which it is at all likely to be confounded is the Lafayette, which everywhere, according to Hilgard and other geologists, directly overlies it, and of which the materials are often quite similar; and we have conclusive evidence that parts of the Grand Gulf have by several authors been included in the Lafayette.

In their relations also to the underlying older strata, these two formations have much in common; for instance, they both 'blanket' a number of older formations, but the Grand Gulf, so far as yet known, overlaps only Miocene, Oligocene and Eocene as far down as

* *Am. Jour. Sci.*, Vol. XXII., July, 1881.